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Home Automation System

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Abstract: The focus of this paper is to develop a system which will allow user to control connected home appliances remotely using an android app. This project is focused on saving human and electric energy. This system consists an android app and Node Mcu. Home appliances are connected with Node Mcu using relays, which is connected to Wi-Fi. By using this System, user can control connected home appliances from anywhere using internet connection.

I. INTRODUCTION

Home automation is a system in which user can control various connected home appliances using internet. Existing home automation system are based on wired communication. As compared to wired system, Wireless systems are often of great help for automation systems. Wireless systems are used every day and everywhere, with the event of wireless technology like Wi-Fi, cloud network etc. In this system home appliances are controlled by an android app and handled by IoT module Node Mcu. The status of appliances is read by Node Mcu and updates in cloud server. Even if a user is at long distance android app reads the status from cloud server and shows it to user.

II. SCOPE OF THE PROJECT

This project is limited to turning connected appliances off and on but not limited to home appliances. It sends status of the appliances to the cloud server and mobile application reads it from there and shows to the user. There are some benefits of this project:

1) *Smart Locks:* These smart locks allow user to unlock door from home or far from home for someone else. User can also schedule when door locks.
2) *Sensor Technologies:* Sensor technologies are very much useful in home. Smoke sensors can sense slow and fast burning fires and carbon monoxide level. Sensors can alert about earthquakes, Weather condition and about hurricanes.
3) *Smarter Appliances:* Nowadays many smarter appliances are in use like Alexa, google home which can control home appliances and can talk to us, sing a song for us and any more tasks.
4) *Smart Theft Detection:* With the use of some sensors user get notified if someone or something is trying to enter without permission. These Sensors can be used on windows and doors of the house and can be turned on or off using internet.

III. PROPOSED WORK

This system mainly focuses on controlling lights and other home appliances using internet. This project focuses on saving human and electric energy. This project consists of an android application and Node Mcu. Different appliances are connected to the Node Mcu which is connected to Wi-Fi network. Nowadays automatic systems are more preferred than manual systems. Wireless Home automation system using IoT is a system that uses android device to check and alter the status of home appliances from anywhere using internet connection

System Architecture
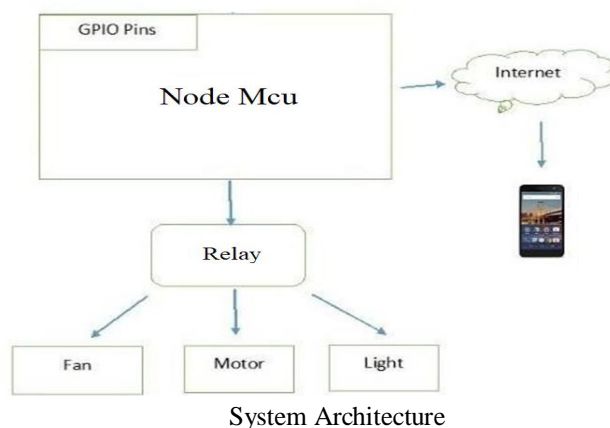
This project mainly focuses on checking and altering the status of home appliances using internet connection. This system consists two parts – i) Hardware module and ii) software.

Hardware module have Node Mcu and relays and in prototype model Node Mcu and LEDs. Node Mcu is the central device which connected to the Wi-Fi network. The communication between hardware and software is handled by cloud server. Software is used as Front end, which is an interface to communicate with Node Mcu. It has list of home appliances which user can control.

Relays are used to convert 220V-250V to 5V. It can withstand a load of 10A at 240V.

Software is a user-friendly interface, which enables user to view and alter the status of home appliances.

A. Node Mcu

Node Mcu is an IoT module based on ESP8266 Wi-Fi module. Node Mcu uses Lua Scripting language and is an open source Internet of Things (IoT) platform. It has 17 digital input/output pins (of which 4 can be used as PWM outputs). It has a USB connection, a power jack and a reset button. It is commonly used and user-friendly module. Simply connect it to a computer using a USB cable or power it with AC- to-DC adapter or battery to get started.

Node Mcu

B. Leds

A light emitting diode is a semiconductor device that emits light when an electric current pass through it. Light is produced when particles carrying current combine together within material.


LED

IV. IMPLEMENTATION AND ANALYSIS

This project consists of two parts- i) Hardware Module and ii) Software. The following figure shows the layout of the system. Wi-Fi connectivity can be taken from a Hotspot of mobile phone or Wi-Fi Router, and Hardware Module to communicate with each other. Users use internet connectivity to log into the application and can access home appliances

Layout.

The Home Automation System in which there will be different components like Light, Fan, Motor etc. Depending upon user's input through mobile application Components will turn On and Off. After Detection of the obtained output is fed to Node Mcu which is an important part. It handles all turning on and off of Components.
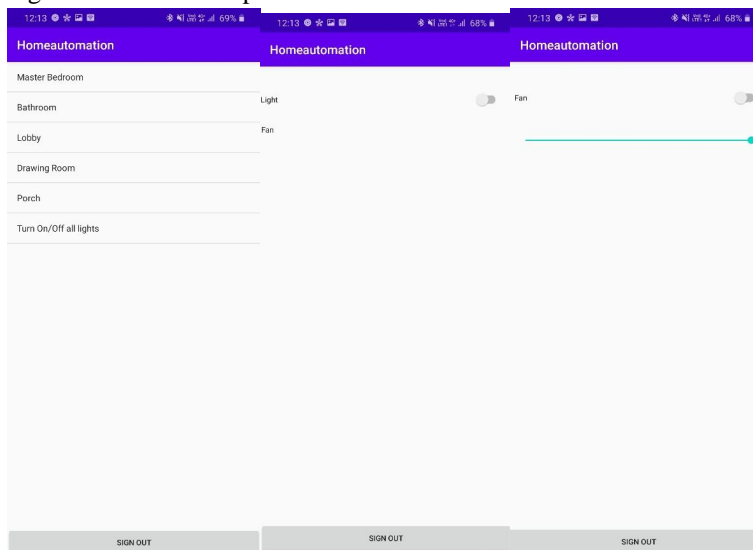
Controls for home appliances

V. CONCLUSION

It has proved that home automation system using IOT works satisfactorily by connecting simple appliances to it and also it has been verified that the appliances were successfully controlled remotely through internet. The home automation system also processes the changes according to the requirement along with sensing data, like temperature, gas, light, motion sensors.

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